NEW YORK TIMES
February 6, 1970

12 Dogs Develop Lung Cancer In Group of 86 Taught to Smoke

By LAWRENCE K. ALTMAN

Twelve of 86 beagles that were trained to smoke developed lung cancer, two scientists reported yesterday. They said it was the first time malignant tumors had been produced in large animals by exposing the animals to cigarette smoke.

The scientists are Dr. E. Cuyler Hammond, an epidemiologist associated with the American Cancer Society, and Dr. Oscar Auerbach, a pathologist at the Veterans Administration Hospital in East Orange, N. J. They disclosed their findings at a news conference following a scientific session of the American Cancer Society at the Waldorf-Astoria Hotel.

The society said the findings "effectively refute contentions by cigarette manufacturing interests that there was no cigarette-cancer link, and any claims to the contrary were only 'statistical.'"

In reply, the Tobacco Institute, an organization sponsored by the tobacco industry, said that it was interested in the reported results of the experiment, but that it was "impossible" to "draw a meaningful parallel between human smoking and dogs subjected to these most stressful laboratory conditions."

The study by Dr. Hammond

10050726S3

Source: https://www.industrydocuments.ucsf.edu/docs/plmk0000

and Dr. Auerbach also found the following:

¶Cigarettes with filter tips that reduce the inhaled tar content of the smoke by at least 49 per cent and the inhaled nicotine content by at least 37 per cent are "less harmful to smoke (in dogs) than non-filter cigarettes."

¶There are "dramatic differences in the incidence of malignant tumors in the filter smoking, and non-filter smoking dogs."

¶Death rates for the dogs that smoked were "significantly higher" than among the control dogs—that is, dogs that did not smoke.

¶The degree of lung damage progresses with duration of smoking, but "the evidence indicates that lung parenchymal (tissue) damage advances less rapidly with the smoking of filter-tip cigarettes than with the smoking of non-filter cigarettes."

The smoking experiment with beagles was begun in May, 1967 at the Veterans Administration Hospital in East Orange and is still continuing, according to Dr. Auerbach. Of the 94 beagles involved in the experiment, all but a control group of eight were taught to smoke through an incision in their throats.

In previous work by other experimenters, rodents died after having been exposed to cigarette smoke. But these experiments left continuing skepticism as to whether lung cancer had been induced by the smoke.

Purposes of Study

Dr. Hammond and Dr. Auerbach said their experiment had two purposes: "To determine whether smoking cigarettes with an efficient filter is less harmful than smoking cigarettes but without the filter" and "to ascertain whether smoking cigarettes for two years or longer will produce lung cancer in dogs."

In an interview, Dr. Auerbach recalled that pilot studies done in the mid-1960's showed that beagles developed lung disease such as emphysema and pulmonary fibrosis, as well as changes that, when examined under a microscope, resembled early cancer. Emphysema involves destruction of air sacs. Pulmonary fibrosis involves the development of fibrous tissue in the lung.

"These findings," the researchers reported, "suggested that beagle dogs were suitable for the purpose at hand—provided they could be kept alive for a sufficient length of time to observe long-term effects."

Accordingly, the researchers bought 97 pedigreed male beagles from breeders in upstate New York and observed them for several weeks in East Orange. When they began the study, they made a small opening through the front of each dog's neck into his trachea, a minor procedure known as a tracheotomy.

The tracheotoma open, was connected to a cigarette holder. The dogs were trained to gradually smoke up to a maximum of nine cigarettes a day. All were the same brand of cigarette, which the researchers declined to name.

"They wagged their tails and whined for a cigarette, "Dr. Auerbach said.

The researchers removed three dogs from the group of 97 because of incidental findings before the study began. Of the 94 remaining dogs, eight were used as controls—that is, though they had tracheostomies, they did not smoke. The control beagles lived in cages in the same quarters where the 86 smoking dogs stayed.

The dogs varied considerably in weight. The 38 heaviest were put in one group "with the intention of keeping them smoking until all eventually died," the researchers said.

The remaining 48 smoking dogs were divided randomly into two other groups. Twelve dogs smoked 6,143 filter tip cigarettes in the 875 days of the experiment. The 36 other smoking dogs were subdivided into two groups smoking non-filter-tip cigarettes. Twelve of these 36 were classified as light smokers; they smoked 3,103 cigarettes in the same period. The 24 other dogs smoked 6,129 nonfilter-tip cigarettes.

During the 875 days, "the death rates were in alignment with dosage of tar and nicotine relative to body weight," the researchers said. None of the controls died during this period, but 28 of the 86 smoking dogs died of diseases that rarely kill dogs, they said.

The lung diseases, pulmonary emphysema and fibrosis, and their resultant strain on the heart, called cor pulmonale, were the principal causes of death.

At day 875, the researchers began putting to death the dogs in all groups except the heavyweight beagles smoking nonfilter cigarettes.

Autopsies were performed on all the dead dogs. Slides made of the lung sections were coded. Then they were read by Dr. Auerbach, who had no knowledge of each dog's identity.

Benign and malignant tumors were found in the lungs of 36 of these dogs. Two of the beagles in the control group had benign tumors. The malignant tumors, or cancers, were found in 12 of the heavy smokers of nonfilter cigarettes.

The majority of malignant tumors found in the smoking dogs were of a type known as bronchio-alveolar, which affects the bronchi and the lung's air sacs.

The slides that Dr. Auerbach interpreted as malignant cancer were reviewed by Dr. Raymond Yesner, a pathologist at the Veterans Administration Hospital in West Haven, Conn. He said he agreed with the interpretations.

The researchers said they would study other tissues such as arteries, urinary bladders and brains, to determine what pathological changes might have occurred elsewhere in the smoking dogs' bodies.

Meanwhile, the American Cancer Society warned filter-tip cigarettes smokers not to be "lulled into a feeling of false security by the report of the filter-tip smoking portions" of these studies.

"Filter-tip cigarettes, if they effectively reduce tar and nicotine in the mainstream smoke, are, at best, only less damaging to lung tissue than nonfilter cigarettes," the society said.

Tar and Nicotine Content

Following is a table issued by the Federal Trade Commission in December, 1969, on the tar and nicotine content of various cigarettes:

(Tar content in this chart ranges from high of 32 milligrams per cigarette to a low of 4 mg/cig. nicotine content from high of 2.5 mg/cig to low of 0.1 mg/cig.)

Brand	Type	Tar (mg/cig)	Nicotine (mg/cig)
Alpine	King, M	19	1.3
Belair	King, M	18	1.5
Benson & Hedges	Reg. (HP)	20	1.4
	King (HP)	20	1.5
	100 mm	20	1.4
	100 mm, M	21	1.4
Bull Durham	King	29	1.8
Camel	Reg., NF	25	1.6
	King	21	1.4
Carlton	King	5	0.4
Century	100 mm	21	1.3
Chesterfield	Reg., NF	24	1.3
	King, NF	29	1.6
	King	21	1.4
	King, M	19	1.1
	101 mm	21	1.5
Domino	King, NP	25	1.1
	King	21	1.0
	King, M	16	0.9
Doral	King	15	1.0
	King, M	14	1.0
Duke of Durham	King	10	0.4
Dutchmaster	King (HP)	18	1.1
English Ovals	Reg., NF (HP)	28	2.1
	King, NF (NP)	31	2.5
Esquire	King, NF	22	1.9
Fatima	King, M	10	0.4
Fiesta	King	20	1.5
Gauloises			
Cibarel	Reg., NF	24	1.2
Gauloises			
Disque Bleau	Reg.	21	1.2
Half & Half	King	22	1.5
Herbert			
Tareyton	King, NF	27	1.6
Holiday	King, NF	31	1.9
	King	25	1.6
Home Run	Reg., NF	19	1.3
Kent	Reg.	10	0.6
	King (HP)	17	1.1
	King	16	1.0
	100 mm	19	1.0
King Sano	King	7	0.3
	King, M	7	0.2
Kool	Reg., NF, M	21	1.3
	King, M	18	1.3
	100 mm, M	20	1.5
Lark	King	17	1.1
	100 mm	18	1.1
Life	Reg.	11	0.7
L & M	Reg.	17	1.0
	King (HP)	18	1.1
	King	19	1.1
	100 mm	19	1.1
	100 mm, M	19	1.2
	Reg., NF	28	1.6
Lucky Strike	King	21	1.4
Lucky Filters	100 mm	20	1.4
Mapleton	Reg., NF	26	1.1
	King	22	1.0
Marlboro	King (HP)	19	1.3
	King	20	1.4
	100 mm	22	1.3
	100 mm (HP)	21	1.5
	King, M	21	1.4
Marvels	Reg., NP	20	0.7
	Reg.	4	0.1
	King, NF	24	0.9
	King, M	4	0.2
	King	4	0.2
Montclair	King, M	9	0.7
Newport	King, M (HP)	19	1.2
	King, M	20	1.2
	100 mm, M	21	1.3
Oasis	King, M	19	1.1
Old Gold	King, NF	27	1.4
	Reg., NP	22	1.3
	King	20	1.2
	100 mm	24	1.5
Pall Mall	King, NF	23	1.2
	95 mm (HP)	19	1.2
	95 mm, M (HP)	17	1.1
	100 mm	19	1.1
	100 mm, M	18	1.2
Parliament	King (NP)	16	1.0
Philip Morris	King	16	1.1
Philip Morris	Reg., NF	24	1.5
Commander	King, NF	20	1.9
Philip Morris	King (PB)	19	1.4
	King, M (PB)	15	1.1
Picayune	King, M (PB)	15	1.1
Piedmont	Reg., NF	20	1.4
Players	Reg., NF	24	1.4
Raleigh	Reg., NF (HP)	31	2.1
	Reg., NF	25	1.7
Salem	King	18	1.3
	King, M	22	1.4
Sano	100 mm, M	21	1.5
	Reg., NF	14	0.5
Silva Thins	100 mm	16	0.9
	100 mm, M	14	1.0
Spring	100 mm, M	21	1.2
Stratford	King, M	24	1.0
	King	18	0.7
	King, M	19	0.8
Tareyton	King	16	1.3
	100 mm	17	1.1
Tempo	King	12	0.6
True	King	13	0.7
	King, M	12	0.8
Tryon	King	12	0.9
	King, M	11	0.7
Viceroy	King	18	1.3
	100 mm	19	1.5
Virginia Slims	100 mm	18	1.2
	120 mm, M	18	1.2
Vogue (Colors)	King (HP)	13	0.5
Vogue (Black)	King (HP)	20	0.7
Winston	King (NP)	21	1.4
	King	21	1.4
	100 mm	21	1.5
	100 mm, M	21	1.5
Yukon	King, M	20	0.9

NF—Non-Filter (all other brands possess filters).
M—Menthol.
PB—Plastic Box.
HP—Hard Pack.

Source: https://www.industrydocuments.ucsf.edu/docs/plmk0000